

AVIATION WEEK

DEC. 29, 1947

INCORPORATING AVIATION AND AVIATION NEWS

A MCGRAW-HILL PUBLICATION

Sentinels of Peace



"A just and lasting peace among ourselves and with all nations" . . . that was the goal which Abraham Lincoln set for his countrymen eighty-two years ago. It is the goal toward which we are striving today—more earnestly than ever before. Though the ideal may seem far short of attainment, lasting peace throughout the world represents the hope and

aspiration of men of good will everywhere. Winged through the skies on friendly missions, America's planes are reminders of the might which must ever be the bulwark of permanent peace. Our air fleet has helped to make this country strong; if we are to continue invincible, we must maintain it. Only a powerful America can remain a peaceful America.

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ELECTRICAL EQUIPMENT • ROCKET MOTORS • MICRATA PALLETS • TELEVISION PARTS
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PARALLELING THE AIR LANES**

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Aviation Equipment*

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GROUND

ROCKET MOTORS • AIRCRAFT EQUIPMENT • TELEVISION PARTS • RADIO AND NAVIGATION APPARATUS • LAMPS

As an added guarantee of consistent peak performance of all of its aircraft products, Westinghouse offers a nationwide service organization that helps you in 3 ways. Available 24 hours a day across the nation are: 1st... a complete line of renewal parts; 2nd... skilled mechanics in 34 service shops with modern facilities for shop repairs; and 3rd... Westinghouse Engineering and Service men for "on location" field repairs.

The map below indicates the strategic location of the repair shops at important centers along the nation's air lanes. This is further assurance that your maintenance requirements will be handled quickly, economically and with a minimum of inconvenience.

That you have in Westinghouse a producer of superior equipment and one who provides convenient and adequate facilities for keeping that equipment in good working order. For further information about Westinghouse products and services, ask for B-3775, Westinghouse Electric Corporation, P. O. Box 668, Pittsburgh 30, Pennsylvania.

page



B. F. Goodrich tires outwear concrete in landing tests

RUBBER is in concrete with terrific impact when Lockheed's new drop-tail machine goes into action. This machine tests landing gear by duplicating an actual landing.

The landing gear are lifted to the desired height on the 40-foot tower and the wheels are spun until they reach a speed of nearly 100 miles an hour. Then the landing gear drops to the concrete platform, simulating an airplane's full ride on a hard smooth-down on an airport runway. And for a few seconds, smoke pours from the tires as the wheels skid on a stop.

These punishing 125,000 pound

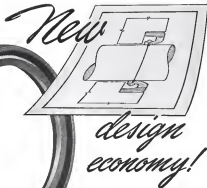
moves are a severe test of the B. F. Goodrich tires and on the landing gear lines here they stood up following the last eighty tests. Lockheed engineers reported that although a hole was worn in the concrete "runway" on which the tires landed, the tires themselves showed no appreciable wear.

These are standard B. F. Goodrich 37.00 x 30 Type III tires. The Type III tire was developed by B. F. Goodrich engineers to make landings smoother and cheaper. Its larger wet volume and lower inflation pressure provide superior cushioning, wear resistance and safety.

And by using dual B. F. Goodrich tires, loads are distributed, tires last longer, safety and economy are increased. B. F. Goodrich engineers have advocated the use of multiple tires for fifteen years. And the first dual wheel was B. F. Goodrich's.

Developing tests to meet the needs of today's and tomorrow's planes is a constant project of B. F. Goodrich engineers. The B. F. Goodrich Company, Aeronautical Division, Akron, Ohio.

B.F. Goodrich
FIRST IN RUBBER



... with this new type Oil Seal
that lasts longer, seals better

Are you seeking an oil seal that will permit greater compression and economy of design?

Clipper Seal may be the answer!

This new type Johns-Manville oil seal is available with a tight design action that permits designing oil seal grooves with depths as little as 1/8". In fact, because of its unique 1-piece design, there is no costly mechanically possible which is too shallow—or too deep—for a Clipper Seal.

Consisting of a rigid heel and a tough but flexible lip molded into a single unit, Clipper Seals provide an exceptionally long wearing oil seal with superior lubrication-retaining, dirt-excluding qualities. They set easily installed and may be removed without damage. Non-metallic, they are also resistant to most forms of corrosion.

Clipper Seals are made to fit any size shaft from 1/2" diameter up. For further information, write Johns-Manville, Box 250, New York 16, N. Y.

**J-M PRODUCTS
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Passings and Gaskets • Friction Materials
Insulators • Adhesive Tapes • Traffic Cones
Tire and Pipe • Industrial Building Materials

Johns-Manville

Exit Brewer Committee

Sen Oscar Brewer will not attempt to extend the life of his special War Investigating Committee beyond its expiration date Jan. 31. Republican leaders have decided to let the standing Committee on Legislation in Senate Department take over the Brewer committee's work. The majority probably will be handled by an independent subcommittee headed by Sen. Homer Ferguson, the Republican Senator from Michigan.

Dirigible and Subsidies

The first responsible company which is willing to invest sufficient private capital to launch an air transport service with modern dirigibles has better than even chances of winning some government subsidy, according to one high federal official.

But government policy makers have asked to consider investing in any high-risk venture commercial project to date because they feel that responsible air for organizing and starting a dirigible airline has with private enterprise, as in any other business venture. The official told Aviation Week, however, that in no case could the civilian government agency be accused of an anti-trust-like behavior policy, despite the fact that neither the military nor naval forces have indicated any interest in that up to now, and virtually exclusive phase of aviation.

Wright's Successor

Despite his difficulties as an administrator, industry and CAA alike are worried by the prospect that the successor to T. F. Wright in CAA will lack his keen technical knowledge. A potential competitor to this job, responsible CAA officials point out, would be the worst fate the agency could sustain.

Mr. Wright told his ten officials several weeks ago that if legislation did not pass during \$10,000 government action, he would resign by June. Most CAA personnel believe he will leave earlier. Reine Assistant Secretary of Commerce Alton was even asked, Mr. Wright informed Commerce Secretary Harrison he would prefer to deal with the monetary difficulty on all matters. This proposal did not appear to Harrison and the result has been a demonstration of serious between the two men.

NEWS SIDELIGHTS

Mr. Douglas Should Know

A competitor of Ansett Airways and the public relations department of Douglas Aircraft Co. greeted with some news they published in this magazine recently announcing that Douglas had definite intentions of building the DC-8. Where, it was asked, did such a story originate?

The answer: Mr. Donald Douglas and so on in connection with the company during the recent visit to Washington. Meanwhile his publicity men say no final decision has been reached, that the plane is still in a preliminary stage of design, and that no orders have been received or anticipated. Now you have both sides of the story.

Parse-Stringers Are Missing

A major weakness of the great Congressional Air Policy Board is becoming evident in the deadline for a report to the committee. The committee lacks proper representation from House and Senate military and naval appropriations subcommittees—the two groups which will be so influential in determining size of air force and naval aviation budgets, the key to success.

The only appropriations committee member on the board is Rep. Kent Steffen, Nebraska Republican. He is chairman of the House Commerce Department Appropriations Subcommittee.

Airlines Worry the Rails

Industries of railroad anxiety over the growth of the airlines is the subject of a statement in the recent issue of Railway Progress magazine that "air passenger revenue last year was more than \$275 million a figure points that the railroads are in a position to compete with air transportation on domestic and foreign air routes in any year from 1937 through 1948." The publication is owned by Robert R. Young's Federation for Railways Progress.

Trevel Tax Repeal

Airline officials familiar with current congressional thinking say there is a "billy good chance" that the new session of Congress will spend the 15 percent tax on travel, which has not been renewed since the war days. Actually, the air transport industry was gambling heavily

on such a repeal when it decided recently to increase its passenger fares another 10 percent. Result to the public, of course, would be the equivalent of a rate reduction.

Fewer CAA Regions?

There is a definite proposal circulating in the Commerce Building is not the number of CAA regions is cut. Further action, if any, will be taken in the spring. Reimbursement within the agency is expected to be favorable, since the plan of many officials in the new region would be dissolved in the changing process. Administrator Wright looks on the plan with favor but apparently has not indicated the approach he will meet among his own aviation acquaintances. Meanwhile, the Office of Bureau Management headed by Assistant Administrator Edward Sturtevant is continuing its efforts to introduce business methods and efficiency in both regional and Washington offices of CAA.

Other CAA Notes:

A major strategy position is continuing in region 1, and in headquarters in New York City, directed by C. Young.

Officials in Washington are discussing replacement of Regional Administrator George W. Wright in the offices of region 1 at Chicago, with other changes in that region likely.

Conditions in region 6 under Joseph Murray are showing some promise from industry and public. This, plus mail from a number of the CAA set-up, according to officials familiar with the situation. Although Murray is liked, much credit is given his youthful assistant, William C. Brown.

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Congressional Sentiment Favors More Funds for U.S. Air Force

But Hill leaders balk at \$6,000,000,000 needed for 70 group program proposed by Springfield and Spain.

The Air Force's 70-group program requiring estimated appropriations of \$6,000,000,000 appears to have slight chance of maturing into the foreseeable future.

Rep. Albert Engel (R. Mich.), chair man of the House Appropriations Military Subcommittee, voiced widespread Congressional sentiment when he termed the suggested program "out of the question." Engel pointed out that a \$6,000,000,000 Air Force appropriation—approximately five times USAF's current year \$1,250,000,000 appropriation—would give a parallel strengthening of the Army and Navy and mean an annual national defense budget "in the neighborhood of \$15,000,000,000—or 37 percent of the present year national budget appropriation, \$40,000,000,000 and 30 percent of the \$16,000,000,000 annual budget which is the goal of the Republican party."

► **New Developments**—Two development deals last week, however, provided by substantially increased military and naval aviation appropriations for the

1944 fiscal year.

► **An Uncomfortable Report** placed the 1944 allocations for Air Force and Naval Aircraft procurement approved by the Budget Bureau at \$1,400,000,000 or approximately 10 percent over the 1944 fiscal year allocation. Aircraft procurements must be appropriated for that year total \$867,800,000, of which \$565,000,000 is for USAF procurement and \$322,800,000 for Naval Aviation procurement.

► **Chairman Owen Roemer** (R. Me.) of the joint Congressional Air Policy Board, announced that his group was prepared to recommend "greatly increased expenditures for the Air Force and Naval Aviation." Roemer stressed, however, that his committee could "only recommend," that the final decision was up to the appropriations committees "which will weigh requirements for aviation against other requirements for federal expenditures." Roemer's group understood the appropriation is a sensitive matter, that the efforts of the President's Air Policy Committee and

Officials Resign

Three War Assets Administration officials, under fire from a House Expenditures in Executive Operations Subcommittee for accepting grossly inflated on new airplanes assigned by A-11 isolated, pending at Lockheed Aircraft Industries, have submitted their resignations. Lockheed Aircraft, a WAA agent, has received commitments totaling \$300,000 for disposal of 328,000 in surplus property.

Subcommittee Chairman, Rep. Russ Kauter (R. Colo.) declared that the three officials—Rep. Gen. Joseph McHugh, Col. John Cates and Col. Harold Berens—"should be fired out of WAA at once" for accepting favors from Lockheed. McHugh submitted his resignation from WAA, effective December 17, six weeks ago and has returned to Army service. Cates and Berens submitted their resignations to WAA administration less than a week ago. Berens' resignation was subject to Radio's charge but an action has been taken on this.

the joint policy board may be related to failure by the school of the appropriate authorities to implement its



NEW PACKET NOSE IMPROVES VISION

Group of Fairchild NC-115A shows new crew compartment moved from step height to C-52 to give position in case for increased vision during landing approach. Turboprop push at foot level point now below for formation flying and observing day operations. Square-based Blackburn Standard prop also 35% additional power of P4W Wing Motors.

programs with funds.

► **Appropriation Bill**—McHugh, Col. R. S. McHugh, USAF budget officer, denounced current reports that USAF would seek a 1946 fiscal year supplemental appropriation, stating "there is no intention of so doing at present." The reports stemmed from legislators directing a \$500,000,000 supplemental appropriation introduction by Rep.

Chester McNee (R., N. H.)—it is generally understood, at the request of the Air Force. Rep. Engel has given a "definite no" to combination of the McNee bill by his military appropriations subcommittee, indicating that a supplemental USAF allocation is as probable, and in any event, would only be passed by Congress after being approved by the Budget Bureau.

First assigned to deputy commander of the newly formed Air Service Command of the AAF, Kauter returned the position at his post as assistant to the Chief of Staff, USAF, in the Air Service Command in Coast B-10A, later returning as commanding general of Air Technical Service Command, Wright Field, and to assignment as special assistant to the AAF commander in Washington. His most recent assignment has been secretary general of the Air Board which he supported last year to formulate basic policy. Frank J. Wilson, retired head of the U. S. Secret Service, will act as Kauter's consultant.

My Gen. James Jones, who headed the old Air Inspector's office and was a principal target of the Senate subcommittee's criticism, was transferred to command Southwest Air Materiel Area, McClellan Field, Calif. Jones will be the only major general in such an assignment. Of the seven airmen, three are recommended by Congress and three by legislative branch. Jones will replace a colonel—Col. Arthur Vannoy.

Appointed to head the three divisions under Kauter.

► **My Gen. S. Chis Shatt**, now chief of Army and Air Force training, was named Air Inspector, in charge of a division which will serve as "watch dog" over internal functioning of the USAF to assure exclusivity of roles of the staff of staff.

► **Col. Joseph Dixon** will continue in the post he now holds, general counsel, under Kauter's jurisdiction. The present staff division was previously under

Air Force Shuffles Inspectors

My Gen. Hugh Kauter leads new division with FBI man as investigative aide; Jones transferred.

Reorganization of the Air Force in aviation service, which has been under heavy fire from the Senate War Investigations Subcommittee for its failure to investigate My Gen. Bennett S. Myers, wartime deputy chief of Air Force procurement, was announced shortly after a Federal Grand Jury indicted Myers on a count of perjury and subornation. The Justice Department contemplated bringing additional charges of fraud, coercion, attempted extortion, income tax evasion, bribery, and conspiracy to defraud the government against Myers.

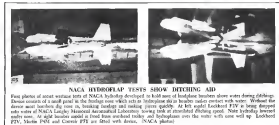
An Force reorganization created an Office of the Inspector General of the U. S. Air Force, with three divisions, to supplement the Office of Air Inspector.

My Gen. Hugh J. Kauter, former Air Force Inspector General, reports di-

rectly to USAF Commanding General Carl Spaatz.

► **Inspector Apostle**—Kauter, outgoing spokesman of the Air Force War II era was selected from active duty at 1939 as Air Corps Colonel, after a service career with included graduation from U. S. Naval Academy (1918), transfer to Army staff artillery (1921) and to the aviation branch, Signal Corps, in 1927. He was chief of staff of the first general headquarters Air Force, under Gen. Frank M. Andrews, and eventually had headed field service at Wright Field, during the formative years of the four-engine B-17 Flying Fortress.

He was ordered back to active service in 1942 after his previous criticism of high policy makers who delayed development and mass production of long range bombers. A critical and revealing book, "The Fight For Air Power," by Gen. W. B. Flinn, was generally attributed to be an expansion of Kauter's opinion.



NACA HYDROFLAP TESTS SHOW DITCHING AID

First photos of aircraft water tests of NACA hydrofoil developed to hold nose of airplane from water when ditching. Device consists of a small panel in the fuselage nose which acts as hydrofoil when water enters under water. Without the device nose bounces, dip nose in, breaking fuselage and making jump quickly. At left model Lockheed F-105 in being dipped into water of NACA Langley Memorial Aeronautical Laboratory, towing tank at streamlined ditching speed. Note hydrofoil lower water nose. At right model used in first tests with hydrofoil and hydrofoil over the water with one will use Lockheed F-105, Marine P-40 and Corsair F-4E are fitted with device. (NACA photo)

Chance Vought Move To Texas Pending Under Navy Agreement

Firm negotiating one-year lease on former North American plant with planned employment of 8,000 indicating large order for Pirate jet fighter.

By WILLIAM KROGER

Chance Vought Aircraft division of United Aircraft Corp. will move its entire operation to the former North American Aviation Plant B at Grand Prairie, Tex., if negotiations under way only this month between the company, the Navy and the Dallas Chamber of Commerce are successfully consummated.

An agreement under which Chance Vought would lease the 1,368,000 sq ft plant from the Navy for one year was sent to Congress late last week and was expected before the year-end.

According to the statement of the Dallas Chamber of Commerce, Chance Vought would employ approximately 8,000 people at the plant in the production of "jet fighters." This would make it the largest plant in the country, or at least to receive a large order from

the Navy for F8U-1 Pirate fighters. The only figure mentioned mentioned for CV's production of this plane was 20. The number of employees mentioned, however, points to a far larger quantity.

• **Year to Transfer**—If the deal goes through, CV would continue only its F4U F production at the present plant at Stratford, Conn. When this contract is concluded it is presumed that the Stratford plant will be closed. Meanwhile, the moving of the remainder of the CV operation would begin and it is estimated that it will require a year for the transfer to be completed. If it is indicated that CV general manager Ben J. Bond will make his headquarters at the Texas plant.

The move, if it goes through as pre-

viously mentioned, will break up the tight concentration of United Aircraft plants in Connecticut for the first time, except during the war, since the corporation was organized in its present form and ended its connection with the Boeing operation after the armed investigation which took place in the early thirties.

The North American factory, near Dallas, was built by the Government during the war for production of B-25s, B-26s, AT-6s and SNJs. Since the end of the war it has been turned over to the Navy and designated a standby plant, to be kept in shape for an emergency with its associated productive facilities intact. It consists of two plants, the smaller of which, plant A, is occupied under a five-year lease by Texas Engineering & Manufacturing Co. and used for production of the Swift 135, modification and overhaul work, and manufacturing of products of a non aviation nature.

The larger section of the establishment, plant B, to be leased by Chance Vought, has a high bay area 300 ft. by 1,150 ft., well suited for an assembly-line operation.

The two plants combined cover approximately 272 acres and adjoin Hensley Field, which is now owned by the city of Dallas. The city has already agreed to spend \$250,000 to add 2,800 ft. to the north-south railroad runway to make it suitable for the operation of jet planes.

• **Inspected by Industrial Proprietors**—Glen L. Martin Co. recently stated that it was one of "the companies" the Navy requested to inspect the former North American facility, an indication that the request for the CV move came from the Navy, possibly in line with long-range industrial considerations on this score. Both the Air Force and the Navy, in addition to a desire to re-activate the stand-by plants, have long had a quiet belief that the aircraft manufacturing industry should be "de-centralized"—at least that the present heavy concentration in several areas should be broken up.

Until the CV move is firm, the only notable large-company transfer from a concentrated area was that of Curtiss-Wright from Buffalo to its surface plant in Columbus.

The CV move, however, would add to an aircraft manufacturing complex already established in the Southwest, with TEXACO at Grand Prairie, Locomotive at Dallas and Consolidated Value at Fort Worth.

FRANCE

30 YEARS OF getting there first



• The Curtiss-Wright XP-47 — first four-engine jet propelled fighter of the U.S. Air Force — now joins the Curtiss 53 — first fighter plane of American military aviation — in the album of famous Curtiss "firsts."

• The XP-47 reflects the engineering, powerplant and extensive research behind the foremost leadership in the aviation industry — just as the S-1 did thirty years ago,

when it was hailed as the first fighter of the Army Air Force.

• The contrast in size, speed and range between the S-1 of 1917 and the XP-47 of today shows what Curtiss-Wright research and engineering mean to modern airplane, engine and propeller development.

• Yesterday, the 100 h.p. engine that powered the S-1. Today, the Wright 884-2,500 h.p. Cyclone

engines that power commercial airplanes from the local airline type to the fastest global transport.

• Yesterday, the wooden fixed propeller. Today, Curtiss Reversible Pitch Propellers with hollow steel blades... with many engines and to order another air travel.

• Today, Curtiss-Wright research is helping to shape aviation's future as it helped to shape its past.

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SMOOTH EVEN FLOW OF BOEING PRODUCTION

Smoothness of surface production activity at Boeing Aircraft Co. is shown here along the final assembly line at the Seattle plant. Crowding the floor are four (from ground) wing subassemblies, center-line and outer-line subassemblies, and (background) B-50 bombers. At far left is final assembly of a Stratofighter for U.S. Air Force.



Bristol Helicopter Aims at New Performance Goals

By IRVING STONE

Detailed study by U. S. aircraft designers of observation now available on the Bristol 171-A helicopter built by the British for commercial applications indicates that serious thought has been given to achieving performance objectives differing from those achieved by American machines.

This is apparent in a number of fundamental points in the 171, most noteworthy of which is the high tip speed at which the rotor blades operate. With a rotor rpm of 287, the 47 ft 5 in. diameter rotor would give a tip speed of 708 ft./sec. Assuming that high speed or cruising speed will be obtained at a rotor rpm of 240 (corresponding to 2,950 engine rpm), the tip speed is 595 ft./sec. at the order of 600 ft./min. While this tip speed is similar to that reported and by some American machines, the takeoff tip speed of over 700 ft./min. well, it is believed, very seriously penalizes the lift-off and hovering performance of the Bristol 171.

► **Benefits of High Tip-Speeds**—Advantages expected for the high tip speed are twofold. First, is a safety feature permitting greater time to go from high helicopter pitch to autorotation pitch during emergency situations, and the saving of inertia energy in the rotor which, in event of engine failure below approach speed 300 ft./min., will permit the hazardous landing through penetrating on the rotor with a compressor blade pitch, or making a float, autorotation landing.

The other desirable feature is that at

a given forward speed there will be a very considerable reduction of tendency to blade tip stall which was one of the limitations in high speed of some earlier American types.

► **Horizontal Tail**—A small, horizontal tail surface is used in the Bristol 171 because American designers have used lately a small amount of horizontal tail area which, it is understood, is for the improvement of longitudinal stability at high speeds. From the apparent use of the Bristol's horizontal tail surface, and also from its appearance as a good sea level machine, it may be assumed that longitudinal stability of this craft at high speed would be good.

► **Blade Construction**—The Bristol's rotor blade construction is all wood for the lifting portion of the blade. As yet, however, considerable work has been performed in design of an airfoil with small pitching moment, location of aerodynamic center and chordwise C.G., so that the aerodynamic moment accounts are practically reduced to zero. This is in line with American practice, which on the more successful "cyclops" has paid great attention to choice of airfoil, and having the chordwise C.G. aerodynamic center, not distant nor all coincident.

► **Backward Fuselage**—Obviously, a considerable amount of forward fuselage background has contributed to this design. Also, to engineers who have examined the Helmer AR III Gyroplane, seen it fly, and followed the description of this craft in the British aeronautical magazines of early 1937, the design details of hub and control of the Bristol 171 look quite familiar and show an

astutely the work of Raulo Halonen, Helmer's chief engineer designer.

► **Ground Design Features**—According to design data recently published in the British magazine *Flight*, the 171 has its physical weight centered in a tubular steel cage. This configuration includes engine and transmission, covers the rotor hub, and affords anchorage for boom and rotor.

► **Engine Details**—Prototype's power plant is a 700-Wing engine (450 hp) by the Bristol. Subsequent models are scheduled to be powered with the best recently mounted Avco Lycoming engine.

Powerplant is mounted on support in a center nacelle on underside of rotor hubcase, with timing drive passing at two major rubber bushed pickup points on horizontal cross-tube of a bracket from tail to the cage. On forward side of engine, support is via two side shafts, one on each side of the gearbox, bolted to crankcase base.

Engine is closed-coupled around the cylinder heads, and cooling extends forward to forward the cooling fan mounted close to the forward. Air intake is through a vent forward of the pylon. After passage across cylinders, air is discharged to atmosphere through a central grid. Carburetor air inlet is through twin ducts to the base of the cooling, running from the cold side back to a mixing box under the up-draft inlet on rear of engine.

Huber intake to carburetor delivers to the mixing box from left side of engine.

► **Transmission** from crankshaft to rotor hub includes a centrifugal clutch and two sets of reduction gears. First stage

reduction is in the level gear on engine forward side; second reduction is made through gear gearing forward rotor drive from crankshaft in by extension shaft direct to the centrifugal clutch driving member, thus being the hubplate of the cooling fan. On rear side of the plate is the clutch surface, the transmitting pad ring of the clutch engaging between this and a landing shaft assembly perfectly suited to the rim of the hubplate.

Two flywheels are pinned on the hubplate and under centrifugal force compress the landing assembly, clutch pad, and hubplate to give solid drive at about 1,100 rpm engine speed. Clutch pad is riveted on a plate bolted to a steel frame surrounding the rock shaft extremities. This drive runs back to a level piston connecting with a bell type level crown wheel. Crown wheel is hub-mounted in a vertical drive shaft around which are pinned the flywheel's sliding levers carrying the fly-piston forming the friction device.

Drive is transmitted through the triple-lever and slappers in an enclosing bell drive housing in a large diameter bell type shaft bearing to the gearbox base, and externally secured to each both with the strong member of rotor hub and driving member of a flexible coupling. Driven member of the latter is the line of the main transmission shaft. Crown part of gearbox cover carries the intermediate sub-enclosures. Brakes is a normal air type engaging and with both cone speed shoes.

Main transmission shaft is 3 1/2 in. dia. 4 gear steel shaft, transmitting at the

lead with another coupling to give drive direct to the gear pinion of upper reduction gear. Base of the enclosing gearbox is bolted together with rotor support case, to the base of the mounting pylon. In upper section of the gearbox is a roller bearing with rotating inner casing shell, thus being bolted to the main gear wheel. Bolted on the underside of the rotor wheel is a low-angle bevel-angled member with a bevel pinion for transmitting drive to the tail rotor shaft. The inner shell casing is usually bolted to the base of the rotor hub housing in which the blades are pivoted.

Rotor hub is transmitted down to the pylon and then to the structure by the main support case, the only loads carried by the gearbox casing being those reactions.

► **Blade Pitch-Change Details**—As disclosed in the British magazine *The Aeroplane*, rotor blades have one preselected sliding-edge spar with spruce ribs and a pivoted fly cover ring. Root fitting consists of five steel

plates mounted between spar flanges hub and bolted through three of plates being at the top and two at bottom, jacking up the fusible root blade root connecting the blades to the hub. By removing one of the attachment bolts the blades can readily be folded.

Blade root portion is a double steel tube, the outer being located on two plate ball bearings taking normal loads only and no thrust. Blade root plate fittings are attached to outer tube. Through the outer tube is a rod attached to the inner end of the inner tube. In this way, all aerodynamic loads on the blade is taken by this rod suspension.

Blade pitch-change mechanism, and as a result, movement of the outer tube is not transmitted to the inner tube because of the second flexibility. By this method, friction forces during pitch changing are reduced to a minimum, the pivot ball bearings providing the only friction present.

Other than centrifugal and aerodynamic twisting moments, the only opposing force to pitch-change mechanism that offered by the fixed blades Aerodynamic twisting moment (ATM) has deliberately been made zero under all normal conditions of operation. This is considered very important, because a large ATM would make very severe loads transmitted to pilot's control, and on unusual ATM distributions between blades would cause severe cyclic movement of the control levers.

Zero ATM is obtained by arranging the blade pitch change arm to be along the line of the aerodynamic center of



U. S. engineers note important variations from American design in first British utility 'copter.

DIMENSIONS OF ROTOR

Main rotor dia.	47 ft. 5 in.
Tail rotor dia.	9 ft. 7.5 in.
Track	9 ft.
Wheelbase	8 ft. 6 in.
Overall height	11 ft. 8 in.
Overall length	45 ft. 6 in.
Overall width (nose to tail)	9 ft. 8 in.

the control sections. Also the sections have been chosen to give a non-constant coefficient about this axis. To offset manufacturing errors in the control sections, dissimilar tubes are provided near the blade tips.

Basic end of rotor tube of the tail rotor suspension assembly is attached to rotor hub through a universal joint forming the flapping and drag lugs. Drag lugs have roller-roller bearings, and drag lugs are provided with an adjustable friction damper. Back blade is connected to its neighbors by connecting rods having roller bushes to give some flexibility and damping.

Rotor tube is a simple steel tubing with machined lugs connecting the ends of the blade links to form a flapping stop in the upward direction. In downward direction the link ends contact with a ring on the hub. This ring is rubber mounted, so that the drag on all three blades simultaneously is limited to 1 lb. In flight, with normal strong angle, the whole disk may be tilted, and if only one blade makes contact, the stop can be deflected as its rubber mounting to allow that particular blade to drop as much as 5 deg. Drag stops are provided by blades contacting stops in the hub.

A three-way spider, rotating with the blades, can be moved vertically or radially in any direction. Spider is linked to the blades by three links through ball joints. If spider is moved up or down, pitch of all blades is changed equally, but if spider is tilted, pitch of the blade passing approximately at right angles to direction of rock will be increased in one direction and decreased by an equal amount when the blade reaches a position 180 deg from this point. This cyclic change in pitch means rotor tilt, which is in the direction of rock.

Reason for maximum cyclic-pitch change occurring at a point not at right

angles to direction of rock is that in level flight the rotor is tilted in relation to line of flight, hence an upstream blade will have a smaller velocity component perpendicular to the blade, than a downstream blade. This means that the angle of attack of the upstream blade is greater than that of downstream unit so that the maximum pitch must not occur at 90 deg from exit position of the blade, but at a point slightly forward of this.

Main rotor control is via three levers to the spider. Two of these are used to rock the spider and the third is used to rotate it. In engine are two conventional pilot's control levers, one used for collective-pitch control, the other for cyclic-pitch control. Inertia dampers are provided in cyclic-pitch control system to reduce any small excessive oscillation from steady-state oscillation of rotor. These dampers consist of a tapered sleeve which rotates a disk as the control is moved. Inertia forces of these disks are used if moved slowly (as they would be by the pilot's control), but lugs when moved quickly (cyclic vibration).

Mechanical linkage is provided between throttle and pitch-control input by cam action designed to give the best mean relation between pitch angle and throttle setting. Cam is operated by cockpit pitch lever, which operates the manual throttle lever. It is possible to change the deflection setting of the cam so that a given pitch can be obtained at given rpm or vice versa. This is done by a separate speed-sensitive lever, which does not alter the rate of change of throttle opening with pitch.

Further Design Comments—In general, the Bristol design appears to be well worked out. Mounting of the power plant with its manifold has several advantages: certain problems in connection with the transmission system, although these problems have been

met and effectively handled in some previous designs. In the Bristol design the lower end of the transmission has been compactly developed. This reduces the effective reduction of the clutch and cooling fan located at forward end of the lower transmission unit with a direct extension from the engine shaft. Grouping of the free wheeling unit and rotor hub with the level gear housing also provides for compactness. Arrangement of the tail attached to the nose of the engine would appear to be quite accessible and serviceable.

Although in a number of respects the rotor hub and associated controls, so accessible the design features of the Helicon Gyroplane, the general link construction has been simplified somewhat by offsetting the flapping pivot from the axis of rotation. While the amount of flapping pivot offset has been kept the maximum which will allow a simple extension block construction, an offset of this nature has been found to be beneficial in improving stability and increasing control sensitivity.

Though the simplicity of "cutter" design involving drag pivot blade mounting has inherent hydraulic blade dampers, satisfactory damping characteristics by means of friction dampers (such as used in the 175) have been well established (as in the Freecote "cutter"). Friction dampers have also been proven reliable in service. Use of both blade to hub dampers and stabilizable cross-damping devices in the Bristol link appears to complicate the design somewhat, and a proper application of either of these devices should suffice.

Attachment of blades by means used to provide for pitch movement also follows rather Helicon design practice. This general method of blade mounting has had considerable satisfactory operational experience in several different topologies.

With respect to the special drop stop structure for the main rotor blades, it would seem advisable to provide adequate blade drop clearance than resort to the special variable stops unless it can be established that these will handle all manual situations, such as when one blade may be inadvertently lifted by a gust while the rotor is operating at low rpm.

Since the control system used with the hub includes a control member which passes through the central position of the hub, this presents use of a planetary gear reduction at this point, hence a pair of large spur gears is used. This is a simple method of obtaining the reduction and has been found quite suitable in designs where lower power was transmitted. In the present design, if rigid supports are provided, this reduction should prove quite satisfactory. A point to be borne in the extremely lower torque applied to hub is compared

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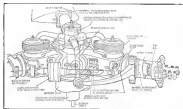
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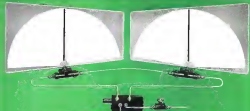
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Detail of main rotor on Bristol 175 (Drawing from "The Gyroplane")



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to other single winged aircraft of this power. The lower torque is the result of the relatively higher rotor speed used. This follows Helmer Gyroplane practice using high rotor speed at low velocity.

The side drive is taken directly from the driven member of the hub through level gears. This avoids a gear step-up in the tail rotor drive at this point that is the usual practice. It is more customary to drive the tail rotor shaft from the main transmission shaft below the final reduction to the main rotor. The internal tail rotor take-off construction is necessitated by the hub configurations in which the controls occupy the central space. In the tail rotor unit itself, a drag post is provided in addition to a flapping post. The main control practice involves only flapping posts or a nodding post. Nevertheless, drag post take construction has given satisfactory service in at least one "cable drive" (Pittsford D-6-45).

The dual control system appears quite simple and has a minimum number of parts and the main function is the cyclic pitch control system should effectively prevent vibration reaching pilot's controls. This control system for vibration reduction was used on the German Flettner controls, although the Bruhl application appears simpler. Because of the possibility for some loss motion in the control system between the control rods and the blades there may be some time lag in motion or vibration transmitted directly from the rotor to the aircraft structure.

Inclusion of a bellows for extremely high apparent speed by pilot action, the extent to which deflection has been considered. While this is a logical part of equipment to include, most pilots have omitted such accessories to save weight.

Electrodeposition Process

Connected with the announcement of having produced a method for attaching electrodeposits of tungsten alloys as metal surfaces, the Electrodeposition Section of the National Bureau of Standards (Washington 25, D. C.) has offered to compete with these inventors in plating parts for service test.

The method is expected to find application on aircraft requiring hardness and durability at elevated temperatures, and tungsten alloys also find use in bearings, pistons, cylinders, dies, molds, and machine parts.

On the alloys investigated, cobalt-tungsten was deposited most easily, and it is stated that to some properties it resembles Sphérite.

Most interesting feature of alloys obtained by this process is their hardness, which is retained under heat and oxidation treatment may be between 400 and 700 on the Rockwell scale.

Research Review

"Droop Wing" Investigations Aid High Speed Craft Design

Wing configurations of new fighters and research planes prompted by aerodynamic effects uncovered in extensive testing at NACA.

By ROBERT McLAUREN

High speed fighter and research aircraft with swept wings include an additional odd angle to their configuration—negative dihedral. These strange "droop wings" are clearly evident on the new Douglas D-558-2, Boeing X-8-47, North American XP-55 and the Navy's special Bell L-39 research craft. The "sawtooth" will also be prominent on the McDonnell XP-55 and XP-58 fighters and the new Air Force stable of supersonic fighters. Underlying this new feature in fighters is a peculiar aerodynamic effect noted by an extensive research program of the NACA.

Dihedral is used on the conventional airplane to improve lateral stability. As the plane is rolled over into a sideways or an asymmetrical position, the downward wing operation at a higher angle of attack than the other wing, resulting in the creation of additional lift tending to return the craft to steady level flight. Indications of wing sweep-back has complicated this simple action by greatly increasing the effectiveness.

Effectiveness of dihedral is measured by rate-of-change of the rolling moment coefficient with the angle of sideslip. When the wing is swept back, this effectiveness changes rapidly with a change to lift coefficient resulting in excessive dihedral effect at medium and high lift coefficients. To minimize this dihedral effect at high lift coefficients a lift becomes necessary to use negative geometric dihedral which produces, in effect, an airplane without dihedral when flying at low lift coefficients (high speed flight) and with the moderate angle required for high lift coefficient (low speed, landing, takeoff).

Results of these NACA tests indicate that for lift coefficients up to 0.8 the effective dihedral of a 40 deg. sweep wing increases with lift coefficient and positive geometric dihedral decreases with negative geometric dihedral. With the wing of zero degree dihedral, the effective dihedral reached a maximum value at a lift coefficient of 0.8, and as the sweep-back wing, the maximum effective dihedral co-

efficient occurred at increasingly lower lift coefficients. With negative geometric dihedral, the maximum effective dihedral coefficient was reached at a lift coefficient beyond the maximum lift. This phenomenon results from the nature of the wing itself, with negative geometric dihedral, the leading wing is a leading edge a smaller angle of attack than the trailing wing, resulting in the latter stalling and a rolling moment being produced on the airplane.

The tests indicate that for any lift coefficient along the straight portion of the lift curve, effective dihedral varies directly with geometric dihedral within a range of the lift from -10 to $+10$ deg. At higher and lower geometric dihedral angles the effective dihedral varies decreases. Within this -10 to $+10$ deg. range, the variation of effective dihedral with positive geometric dihedral proved to be about 75 percent of the value for a conventional unswept wing. For dihedral angles larger and smaller than -10 and $+10$ deg., changes in dihedral angle resulted in changes in effective dihedral of only about 10 percent of the value of an unswept wing.

Directional stability of the airplane, as measured by rate-of-change of yawing moment with the angle of sideslip, is associated with sweeping wings and dihedral and increases lift coefficient. No appreciable increase in directional stability of the airplane was noted with increasing positive dihedral.

Landing positive dihedral caused increasing sweep pitching moments at the stall, creating instability, whereas, increasing the degree of negative dihedral resulted in increasing run-down stabilizing moments at the stall.

As a result of these tests, the phenomena of swept wing dihedral effects were revealed and corrective action taken in the design of current fighters and research aircraft.

REFERENCE

Morgan, Bernard and Sharda, Robert E.: The Effect of Geometric Dihedral on the Aerodynamic Characteristics of a Delta Wing with Swept Back Wing. NACA Technical Report No. 1169.

Getting around corners... on the job!

"FLEXONICS AT WORK"



Left: How REX-FLEX units are commonly installed in aircraft. Above: An aircraft of installation where maximum flexibility is required. Right: REX-FLEX units are used in the aircraft to provide extra space for equipment.



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meter developed by Evans (data on ducted pumping completed at just 100) worked out very much, the flyer reported and they were never more than a few ticks off course. Evans estimated the device weighs about 12 lb and could be carried for around 500 ft produced in quantity.

Fuel consumption on the trip averaged about 5.8 gal. lb with a total consumption of nearly 1,600 gal. which would be a pretty good fuel economy item for an auxiliary automobile for the same mileage. Except for changing the quadrupole, which didn't need it, most of the parts, and 100 lb. again check, there wasn't any work done on the powerplants. Fuel burned ranged all the way from 71 octane to 130 octane at various ports.

Truman and Evans had no design component except for electric heat in the pilot tubes.

The successful completion of the flight can be attributed in large part also to the experience and skill of the two flyers, and their kink-proof, kink-resistant, accurately gauged, when weather demanded. Both are former service pilots. Truman with Air Trans port Command and Evans with an on cargo tank lease in the CFB quarter. Both were flight instructors at College Park (MD) Airport before their record world flight.

New Amphibian Tested By Delaware Firm

Two-engines, step-climb craft designed for all-around use; has speed of 125 mph.

Successful preliminary flight tests of a new step-climb amphibian have been announced by its builders, AeroFlight, Inc., Wilmington, Del. The plane has been designed to fill the need for a light two-engine amphibian with excellent cruising speed and enough cargo space for all-around use.

The prototype was designed by Meredith C. Wood and is designated as the W-6 (Aqua D). It features a high wing all metal fuselage with a wooden hull equipped with large struts for water stability. Seawings also house the main part of the bicycle undercarriage (lower wheel retract into a well in the nose of the hull).

Large windshield and a total of four windows on each side provide excellent visibility for passengers. Two doors in front and two rear cargo doors give wide easy access over the broad wing. A spacious forward deck, accessible from the front stairs facilitates water landing.

► **Performance**—Initial flight tests have indicated that the W-6 will cruise about

125 mph with a useful load of 1,400 lb and an estimated maximum range of 750 mi. The plane's rate of climb is said to be very good and its landing speed quite slow.

Associated with the project for six months was James R. Cogan formerly production liaison engineer at Cessna-Wright in Buffalo who assisted on production design, otherwise all engineering work was done personally by Wood. The wooden hull was constructed in Wilmington by Joseph DeMatteo, formerly Bellanca wood shop foreman, with the metal airframe constructed to Shelden National, their agent fabricator in Shoreham, N. Y. Fuel assembly and flight tests have been conducted at the Philadelphia Seaplane Base where seaplane, Frank Mills, is conducting the water land tests.

The Aero L, powered by two Leaning model G-205A, four cylinder 125 hp engines, is expected to have low maintenance and operating costs. During the extensive water testing and climb tests, engine cooling was completely satisfactory without necessitating the use of an oil cooler.

Owners of Company Planes Form Group

Representatives of industrial and business firms also operate private planes for personal transport and freight service

have organized the Corporation Aircraft Owners Association, Inc. to facilitate fuller exchange of information among such other possessing any possible use of this aircraft.

Incorporated in New York State as a non-profit basis, the CAAOA plans to coordinate all Federal, State and municipal legislation, regulation, and decrees which may affect private industrial plane operations, exchange information through monthly bulletins, seminars, meetings and other activities, work with other aviation groups, encourage improvements in aircraft, equipment and service through joint cooperative action, and the promotion of safety and economy in the operation of members' aircraft.

While no definite restrictions have been placed in the membership of planes operated by members, it is understood that eventually membership will be restricted to large single engine and multi-engine aircraft, since even of smaller planes are inadequately served by the existing Aircraft Owners and Pilots Association.

► **Officers and Members**—Officers of the new organization, chosen by the members at the annual meeting in New York, are W. B. Belden, Republic Steel Corp., Cleveland, Ohio, Chairman of the Board; J. B. Mitchell, Hoesen Brothers Co., Boston, Mass., Vice Chairman; P. J. Lefevre, Bristol Myers Co., Hialeah, N. J., Sec. Treas.

NEW EXHAUST FOR SKYWRITING

New 19 ft pipe exhaust designed to produce lighter colored and longer lasting pipe which will combat effects of previously used exhausts that prevented the smoke letters to roll off and away from these planes in the sky. Equipped as standard at Supplemental Service in Dallas by pilot Joe Grogg of the Skywriting Corp. of America.

Pilot Fatigue Seen As Cause of Crash

Washington (AP)—The pilots of the Berlin Air Transport DC-3 which crashed near Melbourne, Fla., last Feb. 11 were sleepless for several days in an effort to clear themselves from a post-crash investigation.

Evidence turned up at the wreckage (AVIATION WEEK, Oct. 6) revealed is one of the most critical ones at fault: pilots not rested by the Board in an accident case. Together with the objection of American International Airways flying from in mid-Atlantic on Oct. 14, the Berlin crash brought widespread condemnation of all passenger carrying operations by international lines.

✦ **Severe Malfunction**—Miami and owned and operated by Andrew J. Berlin, BART reportedly stopped airline service following the accident.

CAB found that the pilots of the Berlin DC-3 (license N10012, N.Y. in Jan. 1944 P.R.) had flown more than 23 hours out of the previous 37 hr. 45 min. and that they had little, if any, opportunity for rest on the ground. "It is not to direct," CAB said, "to indicate that the pilots were sleepless, but under the circumstances it would not be surprising if they were."

✦ **No Time to Rest**—"In fact," the report continued, "it would be more surprising if while enroute an automatic pilot during the early morning hours they did not fall asleep. Little imagination is required to understand the pilot sitting in the very darkness of the cockpit, lulled by the low hum of flying, with little sleep as the aircraft cruised on automatic pilot and gradually lost altitude. There either by error or loss of control on the left engine or because of the very inexperience of the crew, they were unable to deal with an emergency which neither time nor immediately available power permitted them to correct."

The plane that the ground in nearly level descent and at a very low angle of descent. None of the safety belts in the aircraft survived those of the crash had been buckled. Of the 56 passengers, 12 passengers and the two pilots were killed.

✦ **Not Corroborated**—CAB found that BART had not kept proper records for maintenance and operations of the DC-3. The commander on the left engine and 10 qualifications below both engines were found defective. Additionally, the plane left Newark with an overload of 2,040 lb.

In summary, the Board said the probable cause of the accident was the pilots' flying for long periods of time without adequate rest, resulting in inability to recognize fully awake and alert. A similar

TWA Buys Connies

Purchase of 12 new deep-sea type communications for use on oceanic routes has been announced by TWA. President Lyndon B. Johnson, Colm. DeLoach on the \$15,000, 000 order will start in about six weeks, with the entire fleet to be available by June—on time for the summer travel peak.

As the deep-sea planes are put into service, TWA will retain its older Constellation to the U.S. for domestic use. By June, the current will have 22 Constellations available for domestic operations plus the 12 new planes serving international routes.

✦ **Not to be**—The same day, as Carl Dietrich, assistant technical controller for the Senate Interstate and Foreign Commerce Subcommittee on Aviation, also found "Ergonomics" as the part of Berlin's transport.

✦ **Stoke Domestic Airlines**—Dallas said the airline "was not well organized, conditions and, as an acute example, taking the both pilot and co-pilot had reached a state of complete exhaustion while in flight. The agreed with CAB that the pilots were not well rested at the time of the crash."

The Senate investigation also noted that, because of the lack of rest, action against the airline was required and that CAB's investigation should be continued for continuing such operations. He called for a comprehensive investigation of all airlines scheduled and charter air carriers.

Manufacturers Eye Plane Rental Plan

A government-financed corporation to buy transport planes and lease them to the civil fleet airlines is being developed by part of the aircraft manufacturing industry.

In fact, only the Glenn L. Martin Co. has taken a stand on the subject, but the Air Coordinating Committee, in which Martin submitted a plan, is studying and advancing the proposal in principle. One of the Martin plans calls for 50 percent financing of the proposed new corporation by the Reconstruction Finance Corp., the balance to private investors.

The new corporation would purchase planes of the operators' choice and lease them, at a monthly rate calculated to amortize the cost—down to the end of perhaps 10 years—at the end of the five years. The lease would hold an option to buy any or all planes at any

time, at a price of \$325,000. On a plane priced at \$75,000 to \$8,000, covering both return on investment and amortization. The exact rate would depend on the general of amortization, rate of return on the R.F.C. loan (about 4 percent) and a higher rate on the private loan.

Domestic Carriers Earn \$712,000 in October

Operating profits aggregating \$712,000 in October have made the 16 domestic airlines in their first deficit for the first 10 months of 1947 to about \$9,586,800. On Oct. 31 last year, the carriers had an operating profit of about \$2,718,000.

The \$712,000 profit in October, 1947, compares with an operating deficit of about \$1,515,000 in the same month last year. But most of the loss in Oct. 1946 was caused by the TWA pilot strike.

American Airlines made the largest operating profit in October, 1947, earning \$145,494 in a 71 percent percentage and better. Also in the list were Braniff, Chicago & Northfield, Continental, Northwest, TWA and United Eastern, \$183,000 as the next, the biggest loss during the month. Southwestern for the industry as a whole are expected in November and December, with American and United farthest in the red.

Santa Fe Skyway Denied New Rights by CAB

Santa Fe Skyway, wholly-owned subsidiary of the Atchafalaya, Tropicana and Santa Fe railroad and one of the largest freight lines in the country, has been denied authority to operate in a scheduled domestic carrier line.

In turning down Santa Fe's application for a letter of registration under section 392.5 of the Bureau Regulations, CAB found that the company had not filed a proper request for a certificate of public convenience and necessity by the May 7, 1947 deadline.

CAB said that even if Santa Fe were to file for registration as a scheduled carrier, it would not be in violation of the Civil Aeronautics Act unless (a) it had a domestic route of the airline's control without the renewal of Section 404 of the Act, or (b) joint Board approval is obtained for recognition of Santa Fe Skyway's control by the railroad under Section 403.

The Board said issuance of a letter of registration to Santa Fe Skyway prior to settlement of the issue of control would not be in the public interest.

SHORTLINES

✦ **American**—Continuing its 35 DC flights delays in deliveries on an order for 100 Constellation will lose the carrier to begin gradual trials of 105 in place and 216 ground personnel staffing (p. 1). Most of the companies will be joined when the DC is return to service and Constellation becomes available.

✦ **American Overseas**—Domestic and global operations, and shows activities of American Airlines and ACA in the United States will be completed Jan. 1.

✦ **About 600 AOA** employees at the New York base will be transferred to AA in the migration, but an immediate "severance" will be paid.

✦ **BOAC**—Inauguration of New York-Berlin service on a three-weekly basis and operation of both the Baltimore-Berlin and New York-Berlin routes with Constellation effective Jan. 15 has been announced by company officials. Use of Constellations will be able BOAC to cut in half the flight time between Baltimore and London.

✦ **Capital**—Improved air net current position by \$40,560 during November despite an operating loss of \$69,156 and a net loss of \$123,915. Net loss in November, 1946, was \$184,440. Total expenses were cut down by \$1,712,876 in October to \$1,704,554 and month revenue declined from \$1,904,555 in October to \$1,615,337 in November.

✦ **Northwest**—Has placed a DC-3 in all-glass service.

✦ **Eastern**—Reports perkins traffic from New York to Miami and other southern ports reached a new high.

✦ **Carrier** expects to start regular service to Atlantic City, N.J., through Potomac Naval Air Base within 60 days.

✦ **KLM**—Parent to place Constellation on its Amsterdam-Boston-Buenos Aires service late this month.

✦ **Los Angeles Airways**—Expected to begin service on its third helicopter route, around Jan. 20. Two trips daily will be made between Los Angeles and Santa Monica.

✦ **National**—Starts mail dispatchers' pay \$125 a month in all branches. Contract negotiations with the AFL Radio Club. There have been requests for flying units withdrawn at a 30-day strike since Feb. 22 with the National Airlines Board.

✦ **St. Louis**—During October could \$123,500 net profit on a 71.2 percent load factor and 2,119,831 freight ton miles. September profit was \$11,000.

✦ **United**—Has signed an airframe purchase and freight agreement with Philippine Airlines, which operates from San Francisco to Manila, Cebu, Hong Kong, Shanghai and Bangkok.

✦ **West Coast Airlines**—Has requested CAB permission to set fares up to 51 percent effective Jan. 1 with the gradual reduction in the Portland-Madison, Ore., segment. The schedule operates 4,573,532 revenue passenger miles during its first year, which closes Dec. 31.

CAB SCHEDULE

✦ **Jan. 4**—Flying on Mid-Continental is an indication for alternate Kansas City-New Orleans route. (Deadline 1947).

✦ **Jan. 1**—Meeting on Board's investigation of Constellation airplane TWA approval. (Deadline 1947).

✦ **Jan. 31**—Meeting on records of Board and Chicago & Northfield for removal of restriction of Chicago-Madison service. (Deadline 1947).

✦ **Jan. 31**—Meeting on TWA's A-1 Constellation aircraft permit and schedule. (Deadline 1947 and 1947).

✦ **Feb. 1**—Meeting on Board's investigation of Constellation airplane TWA approval. (Deadline 1947).

✦ **Feb. 4**—Meeting on Constellation Air Lines' route investigation. (Deadline 1947 and 1947).

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A line with the trend toward 400-cycle power, we have designed, engineered, and are producing a completely new 400-cycle relay. Named the Hy-G because of its extraordinary reliability under conditions heretofore 30 Ga. it is described in full in Hy-G from 25 to 400 and up to 800 cps. (See page 10.) After designers are finding many ways to use the Hy-G in controlling new types of high-speed relay systems.

New design features include optimum thermal, mechanical, and electrical performance. They include: (a) reducing the contact of silver, (b) fully laminated contact material, (c) silver impregnated and oil sealed contacts. Weight with standard mounting is only 1.5 grams and size 1.5 by 1.5 by 1.5 inches.

STRATOPAXING BY COOK. The Hy-G 400-cycle relay is also capable of operating at 100 cps. The standard Cook presents one of the most reliable relays with a proven inert gas atmosphere in a hermetically sealed metal enclosure. Mounting and space saving features include: (a) mounting and operating life in most cases up to 100,000 hours. (See page 10.) (b) 1.5 by 1.5 by 1.5 inches.

New Bulletin 400 gives complete data and performance characteristics on the Hy-G will be sent on request. Also detailed Catalog of other engineering products for all purposes.

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A Thing Called Progress

From reports which have arrived since the editorial on still warning indicators appeared on this page, it would seem that *instrument* forces such devices in airplanes but few have the courage of their convictions. From all appearances, the public relations job that manufacturers of still warning indicators have before them is this unreluctant business a appalling. Progress, it seems, is far—in the other fellow.

The advent of our still warning indicators, mentioned before, is a discouraging commentary on the mentality of what is generally considered an enlightened segment of America—the private pilots and instructors. The odds, to the CAA attitude is no surprise, however.

The weaver of the true tale is James Johnson, operator of Springfield (Mo.) Flying Service.

"With a great respect of almost I read your editorial on the still warning indicators. Our first inclination as the instrument had come to the time of an engineering newsletter by Aero Insurance Underwriters I sent and got one. These are troubles begin to come they might be useful to that of other operators, so I will either the complete story, step by step."

The instrument was bought only this year. Johnson instructed his shop foreman to install it in a Cessna 120, and forget it. Some time later he remembered, and found it still was not on the plane.

"Here a problem one. Mechanics are opposed to new gadgets. They had a change is always needed for this, since a change always means new CAA red tape, and the paper work that goes with it, they have no desire to do anything along that line. All mechanics, as a rule, detest paper work. The CAA even encourages it, so we operators are rapidly becoming as involved in it as the government. The ink difference is that we are not reported by them!"

Johnson, however, finally accomplished the installation. Then problem two reared its head. None of the instructors would use it. They said the horn enlightened the students or at least "rattled" them to the point where their landings were improved. No amount of sales argument on Johnson's part could change their minds. In this situation the instructor was a firm acquaintance equipment and recalled for a student training.

So the progressive, safety-minded fixed base operator decided to bide his time and wait for an instruction to "warn up" to the instructor.

"As instructor it was worn enough but there was no indication they would change their minds," he says. "In fact, I found out by flying the airplane that they had removed the fuse so it could not be used."

"I came to this conclusion: We are still in the hands of pilots who fly by the seats of their pants. They do not want their students to learn otherwise. If memory serves me right, instructors have always been opposed to changes in instruction methods. This instrument requires no exception.

"The third and final act happened last Thursday. All

insurance checks on our flight equipment signed my signature before going into the coat according. I noticed a sheet on Cessna NC 77435 that really opened my eyes. It read "Instrument still indicator." I immediately called the shop foreman to the office for further particulars. Here's what I found:

"The CAA aircraft inspector had been in on this month's inspection tour. We look forward to these visits just like a kid would the first day of school. The inspector had wanted to know if we had any airplanes with still warning indicators and if so they must be placed to the effect that the instrument was not to be used until the CAA engineering department had inspected the installation, flight tested the airplane, and 'signed it in.' That last expression is a new one on me but he said it."

So here is how Johnson's shop foreman stood up the question. He had been the gadget in the first place. The instructor wouldn't use it after it was finally installed, and now CAA was opposed to its being on the airplane. Furthermore, thought the foreman, the plane was then going through an annual inspection, and since the instrument was not approved factory equipment, he had no right to leave it in the airplane without submitting it to the CAA for their engineering tests. So why not make it run for everybody and take it out. He did!

"So," says Johnson, "the instrument and its installation cost about \$38. I had trouble getting it installed. The instructors could not use it after it was. The shop foreman couldn't legally leave it installed without engineering tests since it is not approved equipment and, besides, the CAA inspectors said it could not be used without approval of their engineering section. I got a hazing all month just for trying to improve the safety of flight instruction and adding a safety factor to the operation of the plane!"

Now, Johnson asks:

"Does the right hand know what the left hand is doing? Who is using aviation for whom and for what? Why should we continue to be concerned about anyone's act? Apparently the instructor isn't."

"There is a great deal of the best reporting of the unscrupulous Aviation Committee on my desk. They give enormous interest in the safe flight instrument in your editorial one reading and understood it as, do you know where CAA stands on the issue?"

"Our main task in aviation is one of education. From time I put the question in FIVE I have spent 75 percent of my efforts in safety training, to trying to educate my prospects so they could understand what flying is all about. Unfortunately, most of our efforts on education are not appreciated. We had another such in the same position at the instrument except that, in fact, no one had but held it in a pot."

"There is now one and still warning indicator on our stock shelves when I had supposed to have several now run, adding credit to its name and appropriate group of place orders. I can't help but be smiling a bit."

"It makes me wonder how many of us now flying still can be pointed a year from now because of an outdated rule, one that could have been prevented by use of these indicators. How many of these unfortunate firms will be among those opposed to using such an instrument? How many of those opposed have any sense other than their pride? For myself, public law is primary on my mind. There is a hard still warning indicator on our stock shelves that I took to hell was still on that airplane!"

Johnson's story is a powerful argument for a concentrated safety education program backed by every segment of private flying.

ROBERT H. WOOD

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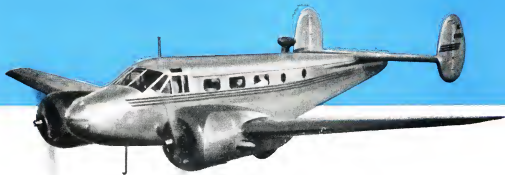


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